

Patent Claims

1) Filter element in which a plurality of layers (2, 3, 5; 7, 8) of a filter medium are assembled to each other in the throughflow direction, in which there is a degree of separation that increases in the throughflow direction for the particles to be filtered out with a storage capacity that decreases in the same throughflow direction, **characterized in that**

- the filter layer (2) on the inflow side is made of synthetic fibers and the filter layer (3; 8) on the outflow side is composed of a predominantly cellulose-containing filter paper.

2) Filter element in which several layers (2, 3, 5; 7, 8) of a filter medium are assembled to each other in the throughflow direction, in which there is a degree of separation increasing in the throughflow direction for the particles to be filtered out with a storage capacity that decreases in the same throughflow direction, **characterized in that**

- the inflow-side layer (2) is composed of a predominantly cellulose-containing filter paper with a weight per unit area of 50 to 200 g/m² and the clean-side outflow-side layer (3) is composed of a predominantly cellulose-containing filter paper with a weight per unit area of 50 to 200 g/m².

3) Filter element according to claim 2, **characterized in that**

- the inflow-side layer (2) is composed of a predominantly cellulose-containing filter paper with a weight per unit area of 50 to 200 g/m² and a one-sided impregnated coating is disposed on the outflow side of the filter medium and in that

- the clean-side layer (3) is composed of a predominantly cellulose-containing and continuously impregnated filter paper with a weight per unit area of 50 to 200 g/m².

4) Filter element according to claim 1, **characterized in that**

- the inflow-side layer (2) is composed of a melt-blown nonwoven web with a weight per unit area of approximately 15 to 150 g/m² and the clean-side layer (3) is composed of a predominantly cellulose-containing, optionally calendared or compressed, filter paper with a weight per unit area of about 50 to 200 g/m².

5) Filter element in which three layers (2, 5, 3) of a filter medium are assembled to each other according to claim 1, **characterized in that**

- the outflow-side layer (3) is composed of a predominantly cellulose-containing filter paper and can be used primarily to stabilize the filter element and that
- all the other layers (2, 5) are nonwoven materials made of synthetic fibers wherein these filter layers exhibit an increasing degree of separation in the direction of flow through the filter for the particles to be filtered out while the storage capacity decreases at the same time.

6) Filter element according to claim 5, characterized in that

- an optionally calendared melt-blown nonwoven web with a weight per unit area of 15 to 150 g/m² is arranged as a third layer (5) between the inflow-side filter medium and the outflow-side filter medium.

7) Filter element according to one of the foregoing claims, **characterized in that**

- the filter media assembled to each other to form the filter element (9) are star-folded.

8) Filter element according to one of the foregoing claims, **characterized in that**

- the layers (2, 3, 5; 7, 8) of the filter media are welded by ultrasound.

9) Filter element according to one of claims 1 to 7, **characterized in that**

- the layers (2, 3, 5; 7, 8) of the filter media are assembled to each other by surface pressure during a folding process.

10) Filter element according to one of Claims 1 to 7 **characterized in that**
- the layers (2, 3, 5; 7, 8) of the filter media are assembled to each other by
gluing with powdered adhesive or with a hot melt impregnating agent or by
surface pressure during a folding process.

11) Filter element according to one of the foregoing claims, **characterized in that**

- one or more of the cellulose-containing filter layers has a percentage of up to
50% of synthetic fibers, especially polyester or glass fibers.

12) Filter element according to one of the foregoing claims, **characterized in that**

- the filter element is used as a main or side stream filter in an oil or fuel filter
system, especially for a motor vehicle.

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